

dead metal parts of portable apparatus to be connected to a live conductor.

**§ 169.681 Disconnect switches and devices.**

(a) Externally operable switches or circuit breakers must be provided for motor and controller circuits and must open all ungrounded conductors of the circuit.

(b) If the disconnect means is not within sight of the equipment that the circuit supplies, means must be provided for locking the disconnect device in the "open" position.

(c) For circuits protected by fuses, the disconnect switch required for fuses in § 169.683(b) of this chapter is adequate for disconnecting the circuit from the supply.

(d) The disconnect means may be in the same enclosure with motor controllers.

(e) Disconnect means must be provided to open all conductors of generator and shore power cables.

[CGD 83-005, 51 FR 896, Jan. 9, 1986; 51 FR 10632, Mar. 28, 1986]

**§ 169.682 Distribution and circuit loads.**

(a) Except as provided in paragraph (b) of this section, the connected load on a lighting branch circuit must not exceed 80 percent of the rating of the overcurrent protective device, computed using the greater of—

- (1) The lamp sizes to be installed; or
- (2) 50 watts per outlet.

(b) Circuits supplying electrical discharge lamps must be computed using the ballast input current.

(c) The branch circuit cables for motor and lighting loads must be no smaller than No. 14 AWG.

**§ 169.683 Overcurrent protection, general.**

(a) Overcurrent protection must be provided for each ungrounded conductor for the purpose of opening the electric circuit if the current reaches a value that causes an excessive or dangerous temperature in the conductor or conductor insulation.

(b) Disconnect means must be provided on the supply side of and adjacent to all fuses for the purpose of de-energizing the fuses for inspection and

maintenance purposes. All disconnect means must open all ungrounded conductors of the circuit simultaneously.

(c) Each conductor, including a generator lead and shore power cable, must be protected in accordance with its current-carrying capacity.

(d) If the allowable current-carrying capacity of a conductor does not correspond to a standard size fuse, the next larger size or rating may be used but not exceeding 150 percent of the allowable current-carrying capacity of the conductor.

(e) Plug (screw in type) fuses and fuseholders must not be used in circuits exceeding 125 volts between conductors. The screw shell of plug type fuseholders must be connected to the load of the circuit. Edison base fuses may not be used.

(f) If the allowable current-carrying capacity of the conductor does not correspond to a standard rating of circuit breakers, the next larger rating not exceeding 150 percent of the allowable current-carrying capacity of the conductor may be used.

(g) Lighting branch circuits must be protected against overcurrent either by fuses or circuit breakers rated at not more than 20 amperes.

(h) Each circuit breaker must be of the manually reset type designed for—

- (1) Inverse time delay;
- (2) Instantaneous short circuit protection; and
- (3) Repeated opening of the circuit in which it is to be used without damage to the circuit breaker.

(i) Circuit breakers must indicate whether they are in the open or closed position.

(j) Devices such as instruments, pilot lights, ground detector lights, potential transformers, etc. must be supplied by circuits protected by overcurrent devices.

(k) Each generator must be protected with an overcurrent device set at a value not exceeding 15 percent above the full-load rating for continuous rated machines or the overload rating for special rated machines.

**§ 169.684 Overcurrent protection for motors and motor branch circuits.**

(a) Except as provided in paragraph (d) of this section, each motor must be

## **§ 169.685**

provided with running protection against overcurrent. A protective device integral with the motor that is responsive to motor current or to both motor current and temperature may be used.

(b) The motor branch circuit conductors, the motor control apparatus, and the motors must be protected against overcurrent due to short circuits or grounds with overcurrent devices.

(c) The motor branch circuit overcurrent device must be capable of carrying the starting current of the motor.

(d) Each manually started continuous duty motor, rated at one horsepower or less, that is within sight from the starter location, is considered as protected against overcurrent by the overcurrent device protecting the conductors of the branch circuit.

## **§ 169.685 Electric heating and cooking equipment.**

(a) Each electric space heater for heating rooms and compartments must be provided with thermal cutouts to prevent overheating. Each heater must be so constructed and installed as to prevent the hanging of towels, clothing, etc., on the heater, and to prevent overheating of heater parts and adjacent bulkheads or decks.

(b) All electric cooking equipment, attachments, and devices, must be of rugged construction and so designed as to permit complete cleaning, maintenance, and repair.

(c) Doors for electric cooking equipment must be provided with heavy duty hinges and locking devices to prevent accidental opening in heavy seas.

(d) Electric cooking equipment must be mounted to prevent dislodgment in heavy seas.

(e) For each grill or similar type cooking equipment, means must be provided to collect grease or fat and to prevent spillage on wiring or the deck.

(f) Where necessary for safety of personnel, grab rails must be provided. Each electric range must be provided with sea rails with suitable barriers to resist accidental movement of cooking pots.

## **46 CFR Ch. I (10–1–12 Edition)**

### **§ 169.686 Shore power.**

If a shore power connection is provided it must meet the following requirements:

(a) A shore power connection box or receptacle and a cable connecting this box or receptacle to the main distribution panel must be permanently installed in an accessible location.

(b) The shore power cable must be provided with a disconnect means located on or near the main distribution panel.

### **ELECTRICAL INSTALLATIONS ON VESSELS OF 100 GROSS TONS AND OVER**

### **§ 169.687 General.**

Except as provided in this subpart, electrical installations on vessels of 100 gross tons and over must meet the requirements of parts 110–113 of this chapter.

### **§ 169.688 Power supply.**

(a) The requirements of this section apply in lieu of subpart 111.10 of this chapter.

(b) If a generator is used to provide electric power for any vital system listed in §169.642 of this subchapter, at least two generating sets must be provided. At least one required generating set must be independent of the auxiliary propulsion machinery. A generator that is not independent of the auxiliary propulsion plant must meet the requirements of §111.10–4(c) of this chapter. With any one generating set stopped, the remaining set(s) must provide the power necessary for each of the following:

(1) Normal at sea load plus starting of the largest vital system load that can be started automatically or started from a space remote from the main distribution panel (switchboard).

(2) All vital systems simultaneously with nonvital loads secured.

(c) The adequacy of ship service generators must be demonstrated to the satisfaction of the OCMI during the initial inspection required by §169.221 of this subchapter.